METHOD, APPARATUS, SIGNALS AND MEDIA FOR PROVIDING CUSTOM OUTPUT IN RESPONSE TO USER INPUT AND E-MAIL SYSTEM EMPLOYING SAME

5   **BACKGROUND OF THE INVENTION**

1.   Field of Invention

This invention relates to apparatus, methods, signals and media for producing custom output in response to user input and to applications programs such as e-mail systems employing same. Aspects of the invention may relate to e-

10   mail systems for use by output limited devices.

2.   Description of Related Art

Many new portable wireless devices are being equipped with microbrowsers which allow users to access web pages in a handheld device markup language (HDML), wireless markup language (WML), or hypertext markup

15   language (HTML) format, for example, from remote locations.   Such microbrowsers are similar to conventional browsers but are optimized for producing displays on small devices. Typically, these microbrowsers provide for text input only and display no, or limited graphics.

Generally, data input capabilities of microbrowsers is facilitated in two forms,

20   namely free text input and static menu choices. Free text input is provided by permitting the user to define the contents of a particular field, such as an e-mail subject field, for example, by using a keypad, such as a telephone keypad on a wireless telephone, to individually enter each character into the field.   Once the user has completed entering all desired characters, the

25   complete set of entered characters is sent, using the wireless network, from the portable device to an e-mail server. Using the static menu method, the device displays a choice list to the user, allowing a phrase or desired action to

be selected from the list. Desired actions may include e-mail control actions such as such as delete or reply, for example.

Free text input is painstakingly time consuming while use of the choice list involves selecting from choices which are made to be very general so as to be useable by a wide range of people. Often this results in an impractical set of choices, of which none is particularly applicable. What would be desirable therefore is a system that would allow individual users to specify their own unique menu choices, thereby providing a degree of customization to the use of microbrowsers.

SUMMARY OF THE INVENTION

The present invention addresses the above problems in the prior art by providing methods and apparatus for producing custom output in response to user input. In accordance with one aspect of the invention, the method may involve locating in a programmable device at least one user-specified output character associated with user input, in response to receipt of an input code representing the user input, and providing the at least one user-specified output character for use by an application program.

In one embodiment, the method may involve receiving the input code from a web interface, or more particularly from a communications system such as a wireless communications system. The input code may originate at a wireless telephone, for example.

The method may further involve providing the output character to an application program, and performing an action based on the output character at the application program. Providing the output character may involve providing a linguistic phrase to the application program, and performing an action at the application program in response to the linguistic phrase. The action may include inserting the linguistic phrase into a field of an e-mail.

The method may further involve programming the programmable device by associating at least one output character with a corresponding input code to

associate linguistic phrases with corresponding input codes. Programming the programmable device may involve receiving the at least one user-specified character from a user input device.

Programming commands for associating the at least one output character with the input code may be received from a communications network. Programming may involve presenting a programming interface to a user to facilitate receiving the programming commands. This may be achieved by operating a web server to permit users to use personal computers or other web communication appliances to access a web page at which a user can specify and associate output characters or phrases with buttons on a wireless device such that activation of a button causes the associated output character or phase to be provided to an application program. Thus, in effect, the output associated with respective buttons can be customized by a user, and thus a dynamic menu of choices is available to a user. For example, the user may wish to change the mapping of buttons to output on a daily basis. A set or sets of input codes and corresponding output characters may be related to a single user or multiple users.

In accordance with another aspect of the invention, there is provided an apparatus for producing custom output in response to user input. The apparatus comprises a programmable device storing at least one user-specified output character associated with user input and a processor circuit. The processor circuit is operable to locate in the programmable device the at least one user-specified output character in response to receipt of an input code representing the user input and is operable to provide the at least one user-specified output character for use by an application program.

In accordance with another aspect of the invention, there is provided provisions for producing custom output in response to user input. The apparatus includes provisions for storing at least one user-specified output character associated with user input, and provisions for locating at least one user-specified output character associated with user input in response to

receipt of an input code representing the user input. The apparatus further includes provisions for providing the at least one user-specified output character for use by an application program.

In accordance with another aspect of the invention, there is provided a computer readable medium. The computer readable medium provides codes for directing a processor circuit to locate in a programmable device at least one user-specified output character associated with user input in response to receipt of an input code representing the user input. The computer readable medium also provides the at least one user-specified output character for use by an application program.

In accordance with another aspect of the invention, there is provided a signal embodied in a carrier wave. The signal includes a first code segment for directing a processor circuit to locate in a programmable device at least one user-specified output character associated with user input in response to receipt of an input code representing the user input. The signal also includes a second code segment for directing a processor circuit to provide the at least one user-specified output character for use by an application program.

In accordance with another aspect of the invention, there is provided system for producing user-defined output characters in response to input codes produced by a web-communicating input device. The system includes a web server operable to establish communications with the web-communicating device using the World Wide Web. The web server is programmed to produce at least one user-specified output character for use in a field of an e-mail produced by an e-mail server in communication with the web server, in response to receipt by the web server of an input code from the web-communicating input device.

In accordance with another aspect of the invention, there is provided an e-mail system comprising a web server operable to establish communications with devices using the World Wide Web, and an e-mail server operable to communicate with the web server. At least one of the web server and the e-

mail server is programmed to produce at least one user-specified output character for use in a field of an e-mail in response to receipt of an input code from one of the devices.

The web server and the e-mail server may be implemented on a common computer or they may be implemented on separate computers.

Other aspects and features of the present invention will become apparent to those ordinarily skilled in the art upon review of the following description of specific embodiments of the invention in conjunction with the accompanying figures.

BRIEF DESCRIPTION OF THE DRAWINGS

In drawings which illustrate embodiments of the invention,

Figure **1**   is a Figure **1** is a schematic representation of an e-mail system according to one aspect of the invention incorporating an apparatus according to another aspect of the invention;

Figure **2**   is a block diagram of a processor circuit of the apparatus shown in Figure **1**;

Figure **3**   is a flowchart of a programming algorithm run by the processor circuit shown in Figure **2**;

Figure **4**   is a pictorial representation of a web page produced by the processor circuit shown in Figure **2**;

Figure **5**   is a tabular representation of a plurality of device records produced by the algorithm shown in Figure **3**;

Figure **6**   is a flowchart of a hook program run by the processor circuit shown in Figure **2**.

DETAILED DESCRIPTION

Referring to Figure **1**, an e-mail system in accordance with a first embodiment of the invention is shown generally at **10**.

The e-mail system **10** includes an Internet Information Services (IIS) web server **18** that cooperates with an exchange server **20**. The exchange server includes a processor **22** running an e-mail application program **24** to provide e-mail services to wireless telephones in a wireless telephone network depicted generally at **26**. Together, the IIS web server **18** and exchange server **20** act as an e-mail service provider **28** to subscribing users of the wireless telephone network **26**.

The wireless telephone network **26** is in communication with the IIS web server **18** using a packet switched network such as the internet **30**, which provides for communications between a base station **31** of the wireless telephone network **26** and the IIS web server **18**. The ability of the IIS server **18** to communicate using the internet **30** also permits users to communicate with the IIS server using their own personal computer **43** as will be described below.

The e-mail system **10** may be used with other communications systems other than the wireless telephone network, however, it is particularly well adapted for use with wireless communications systems because wireless telephones typically produce a limited set of codes in response to user actions such as hard or soft key presses. The IIS server **18** shown in this embodiment provides for a user to associate input codes, produced by a wireless device such as a wireless telephone **50**, with user-specified output characters stored in a programmable device **12** such that certain user-specified output characters are provided to the application program **24** in response to corresponding user input codes received from the wireless device **50**. In this way buttons on the wireless telephone can be used to place user-defined text in fields of e-mail, for example.

To achieve this end, the IIS server **18** includes the programmable device **12** which stores at least one user-specified output character associated with user input. The IIS server **18** further includes a processor circuit **14** operable to locate in the programmable device **12** the at least one user-specified output character, in response to receipt of an input code representing user input and operable to provide the at least one user-specified output character for use by an application program. The user-specified output character may be represented by a code such as an ASCII code, for example.

The IIS server **18** further includes an output interface **16** for communication with the processor **22** of the exchange server **20**, and a program memory **32** for storing a program for directing the processor circuit **14** to carry out the functions described herein.

The processor circuit **14** is programmed by blocks of codes which act as instructions for directing the processor circuit to carry out certain functions to cause the output interface **16** to provide a character or string of characters to the application program **24** running on the exchange server **20**. In an alternative embodiment, codes may be provided to cause the exchange server **20** to be implemented on the same processor circuit **14**. The blocks of codes which direct the processor circuit **14** to carry out the functionality described herein may be provided to the processor circuit by a CD-ROM or other computer readable medium, for example, or they may be provided in code segments which are part of a signal embodied in a carrier wave, which is received by the apparatus **10**, for example. Generally, the blocks of codes are stored in the program memory **32**.

Referring to Figure **2** in this embodiment, the processor circuit **14** includes a microprocessor **42** and a receiving interface including a modem **44** and codes **46** stored in the program memory **32** for directing the processor circuit to act as a web interface to permit input codes to be received from the internet **30** shown in Figure **1**. These codes which direct the processor circuit **14** to receive input codes from the internet **30** also configure the processor circuit to

cooperate with the wireless communications system **26**, through the internet, to receive input codes from the wireless communications system and more particularly to receive input codes from a wireless device **50** of a subscriber of the service who is communicating on the wireless communications system.

5 In addition, the receiving interface includes codes **48** that direct the processor circuit **14** to program the programmable device **12** shown in Figure **1**, to associate at least one output character and/or linguistic phase with a corresponding input code. Referring to Figures **1** and **3**, to do this, the codes **48** include a first block **60** which directs the processor circuit **14** to present a

10 user entry button configuration screen, in HTML format, for example, to a user who has used a browser on his or her own personal computer **43** shown in Figure **1**, to navigate to a logon uniform resource locator (URL) hosted by the IIS server **18**. After completing a typical user logon sequence, the user is presented with a user entry button configuration screen, an example of which

15 is shown in Figure **4**.

Referring to Figure **4**, the user entry button configuration screen may be as depicted generally at **70** including button character-association fields **76**, **78**, **80** and **82**. The user may then navigate to the button character-association fields **76-82** and enter a character, character string, or linguistic phrase which

20 he or she desires to be produced when the corresponding button is activated on his or her wireless device. For example, in the first button character-association field **76**, the user may enter the linguistic phrase "I'll be on vacation from December **20** - January **3** and during this period you can reach me at **(604) 666-3655**". Other phrases can be entered into the remaining

25 button character-association fields. When the user has entered the desired linguistic phrases or characters into the button character-association fields **76-82**, the user may activate a save button **84**.

Referring back to Figure **3**, while the user enters characters and until the save button **84** shown in Figure **4** is actuated, the processor circuit **14** buffers the

30 characters entered by the user and waits for more user input as indicated by

block **62**. When the save button **84** is actuated, the processor circuit **14** is directed to block **64** of Figure **3**, which causes it to associate with the user a device record and to store the device record in the programmable device **12** shown in Figure **1**. The device record serves to associate a set of input codes and corresponding output characters with a user. Optionally, multiple users can be associated with a single set of input codes and corresponding output characters. In effect, the web page shown in Figure **4** acts as a programming interface to facilitate entry and receipt of programming commands from a subscribing user to facilitate association of input codes produced by buttons on the wireless device with user-specified output characters and/or linguistic phrases.

A device record, according to this embodiment is shown generally at **90** in Figure **5** and includes a user ID field **92**, button fields for each button on the user's wireless device, only two of which are shown at **96** and **98**, and character-association fields **100** and **102** associated with button fields **96** and **98** respectively. It will be appreciated that the record structure shown here may be implemented in a variety of ways, including a linked list, for example.

Referring back to Figures **1** and **2**, the processor circuit **14** is further programmed to provide a unique URL to each subscribing user, to permit each subscribing user to associate his or her own unique, custom phrases with user-entry buttons on his or her own wireless device **50** as described above, and to permit each user to have a corresponding device record **90** in the programmable device **12**. Thus, a data structure of device records is produced and maintained by the processor circuit **14**. In other words, the processor circuit **14** relates sets of input codes and corresponding output characters to corresponding users. For ease of representation this data structure is shown as a table at **90** in Figure **5**, but may take on any other suitable form of structure. It will be appreciated that lists of codes produced by user entry buttons on popular wireless devices **50** may be stored in memory and retrieved as required to produce unique web pages corresponding to a subscribing user's wireless device. Thus, when a user

subscribes to the system he or she identifies the wireless device **50** with which the system is to cooperate. This identifies the corresponding button configuration and pre-defined input codes produced by the wireless device **50**.

Referring back to Figure **2**, the program memory **32** further includes intercept codes **52** for directing the processor circuit **14** to interact with the modem **44** to establish communications between the exchange server **20** shown in Figure **1** and the wireless communications system **26** shown in that Figure. The intercept codes **52**, however, include a hook to intercept user entry button press codes produced by a device of a subscribing user and to retrieve the corresponding user-specified output character, characters or linguistic phrase from the programmable device **12** shown in Figure **1** and to pass it/them to the application program, which in this embodiment is the e-mail application program **24**.

In this embodiment, the hook which performs this function is shown generally at **110** in Figure **6**. The hook is invoked or otherwise rendered operational when the user logs on to the IIS server **18** shown in Figure **1**. The logon procedure causes the username to be identified which provides an index into the table shown at **90** in Figure **5** to access the character sequences or linguistic phrases associated with respective buttons on the wireless device **50**. It is assumed that any time any button is activated on the wireless device **50**, the wireless device produces an input code including a data portion. The data portion represents a function activated by the user at the wireless device **50**. The function could include activation of any of the user entry buttons described above, and/or could include activation of any other buttons such as dial pad buttons, for example.

Referring to Figure **6**, on receipt of an input code a first block **112** directs the processor circuit **14** to send a message back to the wireless device querying the user as to whether or not the button press is to be interpreted as an autotext entry. If not, then block **113** directs the processor circuit **14** to receive single characters, in sequence from the user device and to pass a

received sequence of such characters to the application program **24** shown in Figure **1**. The processor circuit **14** shown in Figure **2** then awaits the next input code from the wireless device **50**.

Referring back to Figure **6**, if at the first block **112** the user indicates that the button press is to be used to produce the pre-stored output character sequence associated with that button, a second block **114** of the hook directs the processor circuit **14** to extract the data portion from the input code and to determine whether there is a matching button press code associated with the user ID. If a matching button press code cannot be found, the hook is ended, in which case block **115** causes the input code to be passed directly to the application program **24**. If a matching button press code is found, block **116** directs the processor circuit **14** to retrieve from the programmable device **12** the associated character-association field contents for the matching button, and block **118** directs the processor circuit **14** to transmit the character-association field contents to the application program **24**. This is done by transmitting to the application program **24** a substitute input code comprised of the contents of the character-association field, as the data portion of the input code. The hook is then ended and the processor circuit **14** awaits receipt of another input code.

Using the example shown, when the user who associated the linguistic phrase indicated above presses on his or her wireless device **50** the corresponding user-entry button he/she specified in the web page shown at **70** in Figure **4**, the linguistic phrase "I'll be on vacation from December **20** - January **3** and during this period you can reach me at **(604) 666-3655**" is provided to the application program **24**. If the application program **24** was prompting for text input to be placed in the body of an e-mail, for example, the body of such e-mail would now contain this phrase.

Thus, when a subscribing user presses a user entry button on his or her wireless device **50**, a character, characters and/or linguistic phrase previously associated with such user entry button is provided to the application program

24 as a substitute for the code normally produced by the wireless device. As each user can specify his or her own character, characters, and linguistic phrases to be associated with user entry buttons on his or her wireless device **50**, users are not confined to using general phrases non-specific to their

5   needs.

The IIS server **18** essentially acts as an apparatus for producing user-defined output characters in response to input codes produced by a web-communicating input device. The IIS server **18** is operable to establish communications with the web-communicating input device using the World

10   Wide Web and is programmed to produce at least one user-specified output character for use in a field of an e-mail produced by an e-mail server in communication with the IIS server, in response to receipt of an input code, from the web-communicating input device.

Together the IIS server **18** and the exchange server **20** act as an e-mail

15   system comprising a web server operable to establish communications with devices using the World Wide Web and an e-mail server operable to communicate with the web server. At least one of the web server and the e-mail server is programmed to produce at least one user-specified output character for use in a field of an e-mail in response to receipt of an input code

20   from one of the devices.

While specific embodiments of the invention have been described and illustrated, such embodiments should be considered illustrative of the invention only and not as limiting the invention as construed in accordance with the accompanying claims.